

REMARKS

Claims 1-21 are pending. In the final Office Action (“OA”), the Examiner rejected claims 1-21 under 35 U.S.C. § 103(a) as unpatentable over Shibata et al., U.S. Patent No. 5,371,373 (“*Shibata*”) in view of Shimada et al., U.S. Patent No. 5,348,902 (“*Shimada*”), and further in view of Murai et al., U.S. Patent No. 5,250,812 (“*Murai*”). Applicants respectfully traverse the Examiner’s rejection under § 103(a), and submit that a *prima facie* of obviousness has not been established for claims 1-21 because *Shibata*, *Shimada*, and *Murai*, whether taken alone or in combination, fail to teach or suggest all the claim elements.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim elements. Furthermore, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” M.P.E.P. § 2143.03, ed. 8, rev. 1 (Feb. 2003) (quoting *In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A. 1970)). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Third, there must be a reasonable expectation of success. M.P.E.P. § 2143 at 2100-122 to 127.

Claim 1 is directed to a charged beam exposure for delineating patterns of a system on a substrate to describe the system in a logic expression, to convert the logic expression into a connection of standard cells, and to delineate patterns of the standard cells on the substrate comprising a combination of elements including, *inter alia*, a “standard cell library recording means for recording a standard cell library having an information configured to designing the pattern of the system by using the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard

cells corresponding to the shaping holes.” Independent claims 7 and 15, although different in scope, include similar recitations.

In the Amendment filed on February 12, 2004, Applicants argued that *Shibata*, *Shimada*, and *Murai*, whether taken alone or in combination, at least fail to teach or suggest the standard cell recording means recited in each of independent claims 1, 7, and 15. In the final Office Action, the Examiner relies on newly cited portions of *Shibata*, *Shimada*, and *Miura* and states that:

“[t]he Applicant is respectfully directed to Shibata (373), Column 3, line 28-40; and Column 4, line 24-61, wherein the use of CAD systems having library’s composed of unit cells, which are etched into a cell projection mask (aperture is disclosed). Also, in Shimada (902) Column 1, line 14-29; Column 4, line 1-11; and Column 9, line 24-36; herein the use of CAD systems having library’s composed of basic cells of a standard cell on a mask (aperture) is disclosed. Also in Murai (812), Column 4, line 11-22; Column 5, line 14-29; and Column 7, line 9-25, wherein the formation of unit cell patterns (contained in CAD systems having library’s composed unit cell patterns) in an aperture (mask) is disclosed,” Final Office Action at page 8.

Applicants submit that claims 1, 7, and 15 are allowable at least for the reasons set forth in their February 12 Amendment, as well as the following.

Applicants respectfully submit that none of the new reference citations, either taken alone or in combination, teach or suggest “standard cell library recording means for recording a standard cell library having an information configured to designing the pattern of the system by using the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes,” as recited in independent claims 1, 7, and 15.

Shibata is directed to an electron beam lithography apparatus which includes a lithography data preparation unit for classifying input data into repetitive and non-repetitive

patterns. *Shibata*, Fig. 3. More specifically, *Shibata* in column 3, lines 28-40, cited by the Examiner on page 8 of the final Office Action, discloses that unit patterns are employed to delineate input data classified as repetitive patterns. Further, patterns of delineated input data classified as non-repetitive patterns are further divided into unit areas, which are classified into repetitive unit areas and non-repetitive unit areas. Thus, the cited passage of *Shibata* merely describes classifying the input data into repetitive and non-repetitive patterns, but bears no relation to elements of Applicants' claimed combination including, for example, "standard cell library having first placement positions of the shaping holes on said CP apertures," as recited in claims 1, 7, and 15.

Moreover, *Shibata*, in column 4, lines 24-40 discloses creating an LSI device pattern from an LSI CAD/DA system. In particular, *Shibata* discloses that if the input data represents a repeated pattern (which is also called a cell in some LSI-CAD systems), then the input data is processed by an EB lithography data generation system of the cell projection lithography. *Shibata* further discloses that such processed repeated pattern is generated as a second transfer mask and installed in a second transfer mask mechanism, which the Examiner characterized as "the first placement positions of shaping holes on the CP aperture related to standard cells, as recited in Claim 1." Final Office Action at page 3. Applicants respectfully disagree with the assertions set forth in the final Office Action and fail to see how the above teachings somehow disclose the claimed "standard cell library having first placement positions of the shaping holes on said CP apertures."

Contrary to the Examiner's allegations, *Shibata*, in column 4, lines 24-40, cited by the Examiner in the OA, merely discloses that the repeated pattern processed by a pattern selector is generated as a second transfer mask. However, this does not constitute, and the cited passage is

silent as to, a standard cell library and certainly a standard cell library having first placement positions of the shaping holes on said CP apertures. Therefore, the cited passage of *Shibata* necessarily does not disclose a “standard cell library recording means for recording a standard cell library having an information configured to designing the pattern of the system by using the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes,” as required by claims 1, 7, and 15 (emphasis added).

Thus, in view of the above remarks, Applicants respectfully submit that none of the cited passages of *Shibata* relied on by the Examiner teach or suggest the above quoted element of claims 1, 7, and 15.

Shimada is directed to a method for designing a cell pattern for use with different design automation (DA) systems. *Shimada* discloses that the cells designed by the DA systems are divided into logic function portion and an input/output portion. *Shimada*, in column 1, lines 14-26, cited by the Examiner on page 8 of the OA, discloses that in an automatic placing and routing system for fabricating a semiconductor integrated circuit device, cells are placed and routed between terminals on a semiconductor substrate. These cells include basic cells of a standard cell system and are registered in a library as a functional block (*Shimada* at col. 1, lines 18-20), but do not include a “standard cell library having first placement positions of the shaping holes on said CP apertures,” as recited in claims 1, 7, and 15.

Further, *Shimada*, in column 4, lines 1-11, discloses that a cell with a pattern is regarded as a basic cell of a standard cell system of a semiconductor integrated circuit and is registered in the library. A multiplicity of cells registered in the library are placed and routed in order to constitute a semiconductor integrated circuit device and mask patterns are formed from this

information. *Shimada*, in column 9, lines 24-36, further discloses that a library entered with cells having a pattern designed is applied to the automatic placing and routing by a predetermined DA system whereby the data for forming a mask pattern of an intended semiconductor integrated circuit device is formed. On the basis of this data, a predetermined mask is specified. None of the cited portions of *Shimada*, however, disclose a first placement position of shaping holes on said CP apertures. Accordingly, *Shimada* fails to teach a “standard cell library having first placement positions of shaping holes on said CP apertures,” as required by claims 1, 7, and 15.

Therefore, none of the passages of *Shimada* cited by the Examiner on page 8 of the final Office Action teach or suggest “standard cell library recording means for recording a standard cell library having an information configured to designing the pattern of the system by using the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes,” as recited in claims 1, 7, and 15.

Murai is directed to an electron beam lithography apparatus. More specifically, turning to the passages of *Murai* cited by the Examiner on page 8 of the final Office Action, *Murai*, at column 4, lines 11-22 describes a flow chart for producing delineation data, whereby, first, LSI data is given as CAD data, which is stored in a memory. The CAD data includes data of non-repetitive patterns (or random patterns) and data of repetitive patterns having unit patterns repeated at a coordinate and a pitch designated. Only the repetitive patterns are extracted from CAD data. Thus, *Murai*, in this cited passage, discloses that CAD data corresponds only to the general information of the repetitive pattern and non-repetitive patterns. Such information is unrelated to the claimed “standard cell library having first placement positions of the shaping holes on said CP apertures.”

Moreover, *Murai*, in column 5, lines 14-29, further discloses a pattern of wiring of a memory cell of LSI for DRAM, wherein the unit patterns are regularly arranged at pitches of 0.8 μm and 1.6 μm in X and Y directions, and at column 7, lines 9-24, a method fabricating an aperture plate is disclosed. Such teachings are irrelevant to a “standard cell library having first placement positions of the shaping holes on said CP apertures,” as recited in claims 1, 7, and 15.

Therefore, the cited passages of *Murai* relied on by the Examiner necessarily do not teach or suggest at least a charged beam exposure comprising, *inter alia*, “standard cell library recording means for recording a standard cell library having an information configured to designing the pattern of the system by using the standard cells, and for recording the standard cell library having first placement positions of the shaping holes on said CP apertures related to the standard cells corresponding to the shaping holes,” as recited in claims 1, 7, and 15.

Thus, neither *Shibata*, nor *Shimada*, nor *Murai*, can overcome the above-described deficiencies of the other, and the applied references fail to teach or suggest all the elements of claims 1, 7, and 15. Claims 1, 7, and 15 are allowable, and claims 2-6, 8-14, and 16-21 are allowable at least due to their dependence from claims 1, 7, and 15, respectively.

In view of the foregoing, Applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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